

The Various Control Joints for Concrete Slabs

Concrete, like other construction materials, expands and contracts with moisture and temperature changes. These volume changes may produce cracks in hardened concrete unless they are properly controlled. Provision for volume changes at predetermined locations prevents a concentration of crack producing stress forces. Such provisions are termed control relief joints. Adequately designed and constructed, these joints serve to eliminate unsightly random surface cracks (which detract esthetically from any type of member) by gathering, distributing and dissipating stress forces resulting from temperature and moisture variations.

Lack of, or inadequate, control joints can produce unsightly and damaging cracking. If control joints are to be effective, and perform their intended function, they must be located and installed correctly.

Construction Joints: Construction joints, unlike expansion and contraction joints, are not intended to allow for movement of concrete members, but generally are affected at the end of a lift, at the end of a day's concrete placement, etc. This type of joint is a plane surface between two sections of concrete-concrete placed against concrete already in place which has hardened to the extent that consolidation cannot be effected by vibration or re-vibration. Construction joints may be horizontal as in a structure or column, or vertical as in a slab, or both as in a wall. This type of joint is commonly termed as a "cold joint".

Quality of a construction joint is directly related to quality and placement of the concrete. Maximum bond and water tightness are obtained with quality concrete of the lowest slump which will just permit adequate placement and consolidation. Bleeding and segregation tendencies of high slump concrete promote laitance and weak surfaces of low bonding character. A clean, structurally sound surface is desirable. Coarse aggregate pieces protruding from the plane, as well as slight indentations, are not beneficial or recommended. Surface retardants are often used to achieve a proper surface.

Expansion Joints: Expansion joints permit volume change movement of a concrete structure or member. These are usually constructed by installing pre-formed, or pre-molded elastic/resilient material of approximately 1/4" to 1/2" thickness as wide as the concrete is thick, before the concrete is placed. ***Expansion joints should never be less than 1/4" wide.*** Pre-molded expansion joints for installation in residential, commercial, or industrial slabs may be of fiber, sponge rubber, plastic, or cork composition. Such materials must be highly resilient, and non-extruding in hot weather, or brittle in cold weather.

An expansion joint should always be utilized where a concrete member will join or abut an existing structure of any type. This would include a junction of sidewalks, sidewalk with a driveway, building, curb, or other similar members, as well as where a floor slab joins a column, staircase, etc. ***The square formed by the intersection of two sidewalks should have pre-molded expansion material enclosing the perimeter.*** Normally, expansion joints are not provided in sidewalks other than where the walk abuts an existing structure.

Expansion joints should also be provided in a building floor slab where the slab abuts walls or footings. Sealing of expansion joints is desirable in many outdoor or industrial/commercial applications.

Sawed Joints: Electric or gasoline powered circular saws fitted with either reinforced abrasive blades or metal bonded diamond blades are used to saw contraction joints in concrete. Sawed joints are uniform and straight with sharp edges. Water is generally required as a coolant for the blades to dissipate frictional heat. When used, a constant flow of approximately 2-1/2 gallons per minute is sufficient.

In areas where extremely soft aggregates prevail, sawing can be effected "dry" if performed at an early stage. In this case, moisture of the concrete acts as a coolant. When diamond blades are used, water is an absolute necessity. The water also serves to flush fine particles of concrete away from the blade. Blades, classified as soft, medium and hard, are available for different concretes depending upon hardness of the aggregate, strength of the concrete when sawed, and speed of sawing.